

Long-Run Performance Of U.S. Seasoned Equity Offerings After The Year 1995

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ABSTRACT

This paper questions if the anomaly in the events of seasoned equity offerings has remained significant after it was first documented and analyzed in the year 1995. I find that U.S. domestic firms issuing primary and combined SEOs underperform in the three years after issuance between 1970 and 1994, while the same underperformance is not documented thereafter. This would suggest that the current assessment of the SEO anomaly could be biasedly influenced by early SEO events conducted before the year 1995. Moreover, this paper provides strong evidence that the anomaly is closely related to the incorrect risk adjustment of the Fama-French three-factor model.

Keywords: Anomalies; Long-Run Performance; Seasoned Equity Offerings

1. INTRODUCTION

Financial anomalies, the empirical regularities that do not align with asset-pricing theories, are appealing to both scholars and practitioners for the two reasons. First, the anomalies uncover inadequacies of underlying asset-pricing models in explaining real financial data. The second reason comes from a normative belief that all tradable assets shall be priced in equilibrium as theorized in the asset-pricing models. From this perspective, the anomalies highlight arbitrage profit opportunities. Financial economists have devoted many efforts to discover anomalies since the late 1970s, and identified a variety of anomalies. Some of the anomalies are discussed by Baker and Wurgler (2002), Banz (1981), Barber and Odean (2000), Basu (1983), Campbell (1987), De Bondt and Thaler (1985), Fama and French (1988), French (1980), French et al. (1987), Jegadeesh and Titman (1993), etc.

Schwert (2003) does an excellent job of summarizing the anomalies documented so far. Interestingly, he finds that many of the well-known anomalies have been attenuated, reversed, or even negated after they were first documented. Regarding this disappearing evidence, he proposes two competing hypotheses. Although the anomalies might have been truly present in the past, they have been eliminated by market practitioners who conducted arbitrage strategies. Alternatively, the anomalies would be statistical artifacts that were caused by the data-snooping bias of Lo and MacKinlay (1990).

In the year 1995, two contemporaneous papers by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) introduced for the first time that equity-issuing firms in the events of seasoned equity offerings (SEOs) are followed by long-run underperformance over three to five years after issuance. Apparently, this long-run underperformance of SEO-issuing firms violates the notion of market efficiency, since the mispricing at issuance is not fixed immediately but slowly adjusted over time. According to Daniel et al. (1998), the long-run underperformance is caused by overconfidence and biased self-attribution. Overconfident investors too much emphasize the precision of their private information on issuing firms' fundamentals, so they tend to overreact to public news of equity issuance. Later on, the self-attribution, which is biased toward the private information, induces the investors to underreact to the correct public signal of mispricing over a long time period. In this spirit, the long-run underperformance is often interchangeable with equity market timing, a managerial opportunistic behavior of selling overvalued shares at issuance.

Many papers have been followed on the long-run underperformance of SEO-issuing firms. Excellent surveys are available in Ritter (2003), etc. Interestingly, few studies have exclusively focused on the anomaly of

equity issuance after it was first identified in the year 1995. As inspired by Schwert (2003), this paper investigates if the long-run underperformance has remained robust after the original works by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995). If the abnormal performance were robust, it could call for further attention on discussing how the anomaly is understood in the efficient market hypothesis. Otherwise, the same critique of Schwert (2003) could be applied to question if the anomaly is real.

This paper compares the long-term performance of U.S. domestic firms that have conducted SEOs within the period of January 1970 to December 1994 (henceforth, pre-publication period) with those within the period of January 1995 to December 2007 (henceforth, post-publication period). Several findings emerge. First and foremost, SEO-issuers do not underperform during the post-publication period, whereas the long-run underperformance is replicated by SEOs that are conducted in the pre-publication period. This finding suggests that the anomaly of equity issuance is largely attributable to the abnormal underperformance of early SEO events prior to 1995. The evidence of disappearing underperformance after its initial discovery is robust to various subsample analysis and the notion of time-varying volatility. Once the momentum factor of Carhart (1997) is included in computing Jensen's alphas, however, the post-issue underperformance is no longer observed in the pre-publication periods. This argues that the well-known anomaly could be caused by the incorrect risk adjustment of the Fama-French three-factor model. In sum, the findings of this paper highlight the possibility that the famous anomaly of equity issuance is overemphasized in current literature.

The remainder of this paper is organized as follows. Section 2 describes the data set of SEOs, and explains the methodology used for measuring the performance of SEO-issuing firms in the three years after issuance. Section 3 examines whether the post-issue underperformance has remained robust after the year 1995, and discusses the empirical findings. Finally, Section 4 concludes.

2. DATA AND METHODOLOGY

2.1 Data

From the Thomson Financial SDC database, I collect all SEOs which were conducted by U.S. domestic firms throughout the period of January 1970 to December 2007, and then eliminate the SEOs that are not recorded in the Center for Research in Security Prices (CRSP) CUSIP master file. Following the practices of Lyandres et al. (2008), I further exclude (a) ADRs, ADSs, and GDRs, (b) SEOs without SDC information on offering prices, (c) SEOs in which offering prices are less than \$5, (d) simultaneous offerings of debt and equity, (e) simultaneous offerings to domestic and foreign markets, (f) unit offerings, (g) offerings not listed on NYSE/AMEX/NASDAQ, (h) offerings having no returns on the CRSP monthly return files during the 73-month period centered on the issue month, and (i) offerings not having a CRSP share code of either 10 or 11.

In the events of primary SEOs, firms sell new equity shares for raising external capital to exercise growth options. It is in the events of secondary SEOs that old shareholders sell their own existing shares to liquidate their positions that are locked by initial investments at start-up. Throughout this paper, I define primary SEOs as SEOs that consist of 100% new equity shares and secondary SEOs as SEOs that consist of 100% existing equity shares, respectively. If a SEO is neither primary nor secondary, it is defined as a combined SEO in which mixed shares of both new and existing equity shares are offered. This classification results in 5,664 primary SEOs, 2,766 combined SEOs, and 1,768 secondary SEOs.

2.2 Methodology

As recommended by Mitchell and Stafford (2000), the performance of SEO issuers in the three years after issuance is measured by Jensen's alphas of the three-factor model of Fama and French (1993) and the four-factor model of Carhart (1997). In specific, dependent variables in the factor regressions are monthly returns on a calendar-time equal-weighting (EW) portfolio of firms that have issued SEOs in the past three years. The EW portfolio is rebalanced each month by replacing old firms whose monthly returns reach the end of three-year period with new firms which conduct SEOs in that month. Monthly returns on SEO-issuing firms are obtained from the CRSP. Kenneth French's website provides monthly returns on the Fama-French factors and the momentum factor.

The calendar-time portfolio approach is advocated by many long-term event-time studies to reduce spurious statistical inferences. For instance, Fama (1998) points out that a bad-model problem is not avoidable in any tests for market efficiency, and claims that the calendar-time portfolio method can reduce the problem by some degree. Barber and Lyon (1997) emphasize that buy-and-hold abnormal returns (BHARs) are inevitably subject to the cross-correlations of long-run event windows. Due to the overlapping event windows, they argue that the BHARs could incorrectly overestimate test statistics, so the null of no equity market timing is too frequently rejected. Finally, Schultz (2003) advises the calendar-time portfolio approach to avoid the pseudo market timing that the long-run underperformance, which is established by the BHAR approach, has nothing to do with the true market timing ability.

When constructing the portfolio of issuers as a dependent variable in the factor regression, I use an EW scheme rather than a value-weighting (VW) scheme. According to Loughran and Ritter (2000), the VW scheme gives more weights to large-value firms, although the mispricing at issuance is likely to be more common to small-growth stocks, and thus substantially underestimates the underperformance of small-growth issuers. At the same time, the EW scheme could amplify the bad-model problem of Fama (1998) in that the Fama-French three-factor model tends to overestimate the expected returns on small-growth firms. This means that the equity market timing could be erroneously exaggerated under the EW scheme in which more weights are given to small-growth firms. Altogether, both studies predict that the equity market timing, if it is present, shall be more magnified under the EW scheme, an empirical observation documented in many previous studies. For this reason the EW scheme leads to more powerful tests for long-run underperformance.¹

3. EMPIRICAL RESULTS

Jensen's alpha of the Fama-French three-factor model, denoted by α_{FF} , is estimated by:

$$r_{pt} - r_{ft} = \alpha_{FF} + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t,$$

where r_{pt} is the monthly return on a calendar-time EW portfolio of issuers, r_{ft} is the one-month T-bill rate, MKT_t is the monthly excess return on a market portfolio, SMB_t is the monthly return on a zero-investment portfolio buying small stocks and selling big stocks, and HML_t is the monthly return on a zero-investment portfolio buying growth stocks and selling value stocks. In a similar spirit, Jensen's alphas of the four-factor model of Carhart (1997), denoted by α_{MOM} , is estimated by:

$$r_{pt} - r_{ft} = \alpha_{MOM} + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + \varepsilon_t,$$

where WML_t is the monthly return on a zero-investment portfolio buying winning stocks and selling losing stocks. Throughout this paper, robust t -statistics are calculated to correct for potential heteroskedasticity.

Table 1: Post-Issue Performance of SEO-Issuing Firms

Period	Primary SEOs	Combined SEOs	Secondary SEOs
1970-2007	-0.0029 (-2.575)	-0.0030 (-2.514)	-0.0000 (-0.029)
1970-1994	-0.0031 (-2.680)	-0.0032 (-2.736)	0.0013 (1.293)
1995-2007	-0.0030 (-1.614)	-0.0026 (-1.167)	-0.0005 (-0.278)
1995-1998, 2001-2007	-0.0020 (-1.019)	-0.0017 (-0.660)	-0.0009 (-0.498)
1995-2004	-0.0047 (-2.735)	-0.0038 (-1.351)	-0.0042 (-2.154)
1995-1998, 2001-2004	-0.0036 (-1.885)	-0.0020 (-0.605)	-0.0048 (-2.565)

Note: T -statistics in parentheses are corrected for heteroskedasticity.

¹ Using SEOs placed during the period from 1970 to 2005, Lyandres et al. (2008) find that the VW alpha from the Fama-French factor model is approximately the same magnitude as the EW alpha. I find that all results of this paper unchanged under the VW scheme. The results are available upon request.

Table 1 examines the post-issue performance in the three years after issuance in terms of Jensen's alphas from the Fama-French three-factor model. Over the period between 1970 and 2007, α_{FF} in primary and combined SEOs are significantly negative at the 5% significance level. This long-run underperformance is often interpreted as the managerial market-timing abilities of selling new and mixed equity shares at their overvalued prices (Rangan, 1998; Teoh et al., 2002; etc.). For secondary SEOs, α_{FF} turns out to be insignificant over the same period. As shown by Lee (1997) and Heron and Lie (2004), this finding is consistent with the fact that secondary SEOs are conducted to liquidate the positions of old shareholders rather than to exploit mispricing.

Next, I divide the entire sample period into two sub periods, a pre-publication period between 1970 and 1994 and a post-publication period between 1995 and 2007. The long-run performance in the era of pre-publication is not different from that over the entire sample period; i.e., α_{FF} are significantly negative in the primary and combined offerings, while α_{FF} is insignificant in the secondary offerings. Over the period 1995 to 2007 Jensen's alphas of the Fama-French model are not significantly different from zero in three types of offerings. The abnormal underperformance of primary and combined SEO-issuing firms completely disappeared after it was first documented in the year 1995, just like many anomalies discussed in Schwert (2003). This implies that our current assessments of the market timing abilities in the primary and combined SEO events can be largely influenced by the abnormal performance which is confined to the pre-publication period alone.

Table 1 further investigates the post-issue performance of SEO-issuing firms in various post-publication periods. First, I consider the case in which the issuer portfolios consist of firms that have issued SEOs over the period 1995 to 2004, excluding 1999 and 2000. In other words, SEOs placed during a dot-com bubble period are dropped to control for the potential influence of excessive optimism on post-issue performance. Next, I construct the issuer portfolios by using firms that have issued SEOs over the period 1995 to 2004. This subsample analysis intends to control for the stock market crash starting in 2008, and so examines the post-issue performance until December of 2007. Finally, the subsample analysis controls both the dot-com bubble of 1999-2000 and the market crash starting in 2008.

In the first subsample, the Fama-French alphas are insignificant at the 5% level in the events of primary and combined SEOs. This finding suggests that the disappearing underperformance in the era of post-publication is not caused by the over-optimism flourished during a dot-com bubble period. Remarkably, the second subsample analysis shows that primary SEOs underperforms over the period between 1995 and 2004. However, the underperformance is not observed for combined SEOs over the same subsample period. Indeed, the third subsample analysis does not find the post-issue underperformance of primary and combined SEOs when controlling for both effects of dot-com bubble and market crash. So, the mixed evidence of underperformance makes it difficult to conclude that the abnormal market conditions starting in 2008 could lead to the attenuating anomaly of equity issuance in the post-publication period.

One may be surprised by the secondary SEO observations in the second and third subsample periods, since secondary SEOs are followed by long-run underperformance in terms of the Fama-French alphas. To my best knowledge, no previous literature demonstrates the same anomaly, so that one might take it as the new anomaly of equity issuance. However, the subsequent analysis of this paper shall show that Jensen's alphas in the same periods are no longer significantly different from zero if the momentum factor of Carhart (1997) is included in the factor regression. In my opinion, thus, the negative alphas in the secondary SEO events could be the outcome of the incorrect risk adjustment of the Fama-French model.

As shown in Table 1, Jensen's alpha from the Fama-French factor model is significantly negative in the pre-publication period but insignificantly negative in the post-publication period. Particularly for primary SEOs, α_{FF} in the pre-publication period is almost identical in magnitude to that in the post-publication period; i.e., -0.0031 versus -0.0030. This means that no rejection of the null hypothesis that α_{FF} is equal to zero in the post-publication period must be caused by a higher value of standard error of the EW portfolio of issuers during the period between 1995 and 2007. Notice that the post-publication period is featured with several exotic events of the dot-com bubble

of 1999-2000, the 9/11 terrorist attack of 2001, and the subprime mortgage crisis starting in 2008. All of the events could result in the distinct patterns of return volatility between the pre- and post-publication periods by raising the uncertainty of return-generating processes of individual SEO-issuing firms during the post-publication period. Therefore, Table 1 might erroneously estimate Jensen's alphas since the volatility is implicitly assumed to be constant over time.

With the notion of time-varying volatility, I estimate again α_{FF} with the generalized autoregressive conditional heteroskedasticity (GARCH) model of Bollerslev (1986). Following French et al. (1987), I use the full sample data of monthly return on the EW portfolio of issuers for implementing the GARCH (1, 1) model.² Formally speaking, two equations for mean and variance are given by:

$$r_{it} - r_{ft} = \alpha_{FF} + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

$$\sigma_t^2 = a_0 + a_1 \varepsilon_{t-1}^2 + b_1 \sigma_{t-1}^2$$

where $\sigma_t^2 = Var_{t-1}[\varepsilon_t]$. Model parameters are estimated using conditional maximum likelihood estimation (MLE).

Table 2: Post-Issue Performance of SEO-Issuing Firms with Conditional Variance

Period	Primary SEOs	Combined SEOs	Secondary SEOs
1970-2007	-0.0031 (-4.226)	-0.0030 (-3.604)	0.0009 (1.303)
1970-1994	-0.0036 (-4.225)	-0.0037 (-3.868)	0.0013 (1.569)
1995-2007	-0.0019 (-1.269)	-0.0020 (-1.420)	0.0003 (0.396)

Note: Model parameters are estimated using conditional MLE. *T*-statistics are reported in parentheses.

Table 2 finds that the findings of Table 1 are preserved along with the assumption of time-varying conditional volatility. In terms of Jensen's alpha from the Fama-French model, both primary and combined SEO-issuers underperform in the pre-publication period, while the same underperformance after issuance is not documented in the post-publication period. I find no anomaly in the event of secondary SEOs. After controlling for the time-varying volatility, thus, the findings still conclude that the long-run underperformance of primary and combined SEOs is confined to early offerings in the pre-publication period.

A leading behavioral model of Daniel et al. (1998) assumes that investors are subject to two psychological biases of overconfidence and biased self-attribution. According to their model, the overconfidence of investors provides an issuer with a window-of-opportunity to sell new and mixed equity shares at their overvalued prices. One thinks of the price run-up prior to issuance, which is triggered by investors' overconfidence, as a necessary ingredient resulting in the post-issue underperformance of primary and combined SEOs. In the framework of Daniel et al. (1998), in turn, the disappearing anomaly of equity issuance is anticipated if the price run-ups prior to issuance are absent in the post-publication period.

Table 3: Pre-Issue Performance of SEO-Issuing Firms

Period	Primary SEOs	Combined SEOs	Secondary SEOs
1970-2007	0.0129 (12.236)	0.0311 (24.507)	0.0148 (14.460)
1970-1994	0.0097 (8.205)	0.0285 (20.287)	0.0145 (13.475)
1995-2007	0.0183 (10.597)	0.0361 (14.403)	0.0174 (9.088)

Note: *T*-statistics in parentheses are corrected for heteroskedasticity.

Table 3 examines the pre-issue performance of SEO-issuing firms in the three years before issuance. I estimate Jensen's alpha from the Fama-French model by using monthly returns on a calendar-time EW portfolio of firms that will issue SEOs in the subsequent 36 months over each sample period. I find that Jensen's alphas are significantly positive at the 5% level for all types of offerings over all sub-periods. In specific, the theoretical model of Daniel et al. (1998) seems to work for the primary and combined SEO events in the pre-publication period; i.e., the price increases prior to issuance are followed by long-run underperformance. Coupled with no underperformance

² I choose to model the GARCH (p, q) for $p = 1, 2$ and $q = 1, 2$. Under the different choices of p and q , the results remain unchanged. The results are available upon request.

in the post-publication period, however, the documented price run-ups in the primary and combined SEOs conclude that the behavioral explanation of Daniel et al. (1998) is hardly applied to the disappearing long-run performance during the post-publication period.

The bad-model problem of Fama (1998) explains that the long-run underperformance could be caused by the inadequacy of the Fama-French model in computing Jensen's alphas. Thus, it is worthwhile to evaluate the post-issue performance using alternative asset-pricing models. Among others, I choose the four-factor model of Carhart (1997) in which a momentum factor is augmented as the fourth risk factor. The momentum factor reflects a portion of risk metrics, which is not explained by the Fama-French three-factor model.

Table 4: Long-Run Performance of SEO-Issuing Firms, Evaluated by the Four-Factor Model

Period	Primary SEOs	Combined SEOs	Secondary SEOs
1970-2007	-0.0011 (-0.967)	-0.0004 (-0.347)	0.0018 (1.727)
1970-1994	-0.0019 (-1.496)	-0.0019 (-1.585)	0.0018 (1.756)
1995-2007	-0.0012 (-0.680)	0.0003 (0.182)	0.0018 (0.976)
1995-1998, 2001-2007	-0.0006 (-0.289)	0.0009 (0.342)	0.0012 (0.677)
1995-2004	-0.0020 (-1.319)	0.0014 (0.581)	-0.0013 (-0.666)
1995-1998, 2001-2004	-0.0016 (-0.837)	0.0024 (0.616)	-0.0021 (-1.194)

Note: *T*-statistics in parentheses are corrected for heteroskedasticity

Table 4 examines the long-run performance of SEO-issuing firms using the four-factor model. The results are interesting. I find that no intercepts remain significant in the events of primary, combined, and secondary SEOs over any periods. That is to say, once the four-factor model is admitted as a correct asset-pricing model, the anomaly of equity issuance completely disappears. This evidence is questioning if the well-known anomaly of equity issuance may be more artificial than actual, which is caused by the incorrect risk adjustment of the Fama-French three-factor model. In particular, the subsample analysis for secondary SEOs concludes that the anomaly of secondary SEOs in Table 1 does not remain robust when the four-factor model is adopted, thereby strengthening that the post-issue abnormal performance is observed only under the Fama-French factor model.

4. CONCLUSION

A research by Schwert (2003) documents that many of the well-known anomalies have been attenuated or have disappeared since they were first identified and analyzed, which subsequently leads to the important critique that the anomalies are simply overemphasized in many studies. Inspired by his work, this paper questions if the long-run underperformance of firms that have conducted SEOs remain robust after the anomaly was first documented in Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995). If the abnormal performance of equity issuance does not remain robust, the same critique of Schwert (2003) can be applied.

A calendar-time portfolio approach is used to evaluate the performance of SEO-issuing firms in the three years after issuance. Several findings emerge. In terms of Jensen's alphas from the Fama-French model, the post-issue underperformance is supported by primary and combined SEOs that are placed by U.S. domestic firms during the entire sample period ranging from 1970 to 2007. However, the long-run underperformance is confined to SEOs in the pre-publication period between 1970 and 1994, and disappears in the post-publication period starting in the year 1995. The evidence of disappearing underperformance is robust to different subsample analysis and the notion of time-varying conditional volatility. Therefore, the anomaly of equity issuance, which is often cited in the current literature as the managerial market-timing ability to sell overvalued equity at issuance, is largely attributable to the abnormal behavior of early SEO events prior to the year 1995. Moreover, the behavioral theory does not explain the disappearing anomaly of equity issuance during the post-publication period. Once the momentum factor of Carhart (1997) is included as the fourth systematic risk factor, the post-issue underperformance is no longer observed for primary and combined SEOs for any cases. This suggests that the well-known anomaly of equity issuance could be related to the incorrect risk adjustment of the Fama-French three factor model, an asset-pricing model used in the original studies of Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995). Overall, this paper concludes that the post-issue underperformance of primary and combined SEO-conducting firms may be exaggerated to some degree.

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